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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1797

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@tuckerellis.com

Office Action Summary	Application No.	Applicant(s)	
	10/563,144	SHI, HANXIANG	
	Examiner	Art Unit	
	JENNIFER A. LEUNG	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2009 and 22 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments filed October 14, 2009 and December 22, 2009 have been considered. The changes made to the specification and drawings are accepted. Claims 1-7 are under consideration.

Claim Objections

2. Claim 3 is objected to because the phrase "settled on the reactor shell (1) and" in line 3 should be deleted. It is noted that this limitation has already been incorporated into claim 1, at lines 4-5. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Regarding claim 1, it is unclear as to the structural limitation Applicant is attempting to recite by "the axisymmetric body and annular axisymmetric body are formed by rotating a single curved line... around the axis" (at lines 5-7), because it is unclear as to what Applicant means by "a single curved line". As noted from Applicant's disclosure, e.g., FIGs. 1 and 2, the axisymmetric body **2** and the annular axisymmetric body **3** are each formed from separate curved lines, not a single curved line. Alternatively, it is noted that the line which forms the axisymmetric body **2** is composed of several curve portions (e.g., R1, R2, R3, etc. in FIGs. 1 and

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2), and is therefore not a "single curved" line. Likewise, it is noted that the line which forms the annular axisymmetric body **3** is composed of several curved portions (e.g., R8, R9, R10 in FIG. 1; and R6, R7, R8 in FIG. 2), and is therefore not a "single curved" line.

Claim Rejections - 35 USC § 102 and § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Broughton (US 3,523,762).

Regarding claims 1 and 2, Broughton discloses an apparatus (see FIGs. 2-3; column 4, line 48 to column 6, line 15) comprising a cylindrically shaped shell (i.e., defining circular chamber **8**) with a smooth inner surface, wherein a rotary build-in member comprising an axisymmetric body (i.e., convex baffling means **11**) and an annular axisymmetric body (i.e., concave baffling means **12**) are installed inside the reactor shell, wherein the annular axisymmetric body **12** is settled on the reactor shell **8** (see FIG. 2). The axisymmetric body **11** and the annular axisymmetric body **12** are formed by rotating, as best understood, a single curved line (i.e., a convex parabolic line for the baffling means **11**, and a concave parabolic line

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for the concave baffling means **12**; see column 4, line 47 to column 5, line 27), as a generatrix, with the exception of straight lines, around the axis. Note that the recitation with respect to the apparatus being "configured to facilitate contact between a first fluid and a second fluid" has not been given patentable weight, since the fluids do not form part of the apparatus. See MPEP § 2114 and § 2115.

Regarding claim 3, the annular axisymmetric body **12** is settled on the shell **8** and formed by rotating a straight line (i.e., located at the inner surface of the shell) and a curved line (i.e., defining faces **17**, **18** of baffling means **12**) around the rotation axis, wherein the straight line is parallel to the rotation axis, and the two ends of the curved line are connected with the two ends of the straight line respectively, and the straight line and the curved line are within the same plane, and the distance between the straight line and the rotation axis is longer than that between the curved line and the rotation axis (see FIG. 2). The axisymmetric body **11** is formed by rotating a curved line around the rotation axis, the curved line's two ends being connected with the two ends of the rotation axis respectively, and the curved line and the rotation axis are within the same plane. The axisymmetric body **11** and the annular axisymmetric body **12** being coaxial, and the axisymmetric body **11** being mounted on the annular axisymmetric body **12** (i.e., the baffling means **11** indirectly rests upon a lower baffling means **12**; see FIG. 2).

Regarding claim 4, the maximum diameter of the axisymmetric body **11** is not less than the inner diameter of the annular axisymmetric body **12** (see FIG. 2).

Regarding claims 5 and 7, the axisymmetric body **11**, annular axisymmetric body **12** and shell **8** are integrated to define a unit, and several units are counted in the reactor from top to bottom and connected together (see FIG. 2).

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5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Broughton (US 3,523,762).

The shell **8**, the axisymmetric body **11**, and the annular axisymmetric body **12** in the apparatus of Broughton appear to be manufactured separately and installed as desired within the apparatus (see FIG. 2). The examiner further takes Official Notice that welding, riveting, screwing or bolting would have been recognized as well known connecting techniques in the art.

6. Claims 1, 2 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bodnaras (US 5,741,466).

Regarding claim 1, Bodnaras (see FIGs. 4 or 6a, for example) discloses an apparatus comprising: a rotary build in member comprising an axisymmetric body (i.e., inner core **56**, FIG. 4; or inner core **88**, FIG. 6a) and an annular axisymmetric body (i.e., outer shell **54**, FIG. 4; or outer shell **84**, FIG. 6a), wherein the axisymmetric body and the annular axisymmetric body are formed by rotating a single curved line, as a generatrix, with the exception of straight lines, around the axis. Although a reactor shell is not specifically illustrated in FIGs. 4 or 6a, it is noted that Bodnaras discloses the provision of a reactor shell (i.e., frame **24**; column 4, lines 42-53) in the embodiment of FIG. 1a for housing the bodies of the apparatus as a unit. Accordingly, a reactor shell would be inherent of the apparatus shown in FIGs. 4 or 6a, and if not, it would have been obvious for one of ordinary skill in the art at the time the invention was made to similarly provide a reactor shell for housing the bodies in FIGs. 4 or 6a of the apparatus as a unit. As such, the annular axisymmetric body **54** or **84** would be settled on the reactor shell of Bodnaras. Note that the recitation with respect to the apparatus being "configured to facilitate contact between a first fluid and a second fluid" has not been given patentable weight, since the

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fluids do not form part of the apparatus. See MPEP § 2114 and § 2115.

Regarding claim 2, as noted from FIGs. 4 and 6a, the annular axisymmetric body **54** or **84** defines a smooth outer cylindrical surface. Accordingly, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a cylinder shaped reactor shell having a smooth inner surface (i.e., to interface with the outer cylindrical surface of the annular axisymmetric body) in the apparatus of Bodnaras, in order to house the bodies of the apparatus without bypassing fluids around the bodies of the apparatus.

Regarding claims 5 and 7, the rotary build-in member comprising the axisymmetric body **56,88**, the annular axisymmetric **54,84** and their corresponding shell are integrated together to form a unit (see FIGs. 4, 6a). Also, several such units are connected together from the top to the bottom (see column 5, line 67 to column 6, line 8).

Regarding claim 6, the shell, the axisymmetric body **56,88**, and the annular axisymmetric **54,84** appear to be manufactured separately and installed as desired (see FIGs. 4 and 6A). The examiner further takes Official Notice that welding, riveting, screwing or bolting would have been recognized as well known connecting techniques in the art.

Response to Arguments

7. Applicant's arguments filed October 14, 2009 have been fully considered but they are not persuasive. Applicant (at page 7, second paragraph) argues,

“...Broughton does not teach or suggest the multiphase reactor configured to facilitate contact between two fluids as in claim 1. To the contrary, Broughton teaches the reactor facilitating contact between a fluid and a solid (column 2, lines 10-11). The claim is directed to having two or more fluids continuously change the velocity and direction of flow so as to have them contact and react sufficiently. Broughton does not teach or suggest two fluids making contact in the reactor.”

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The Examiner respectfully disagrees.

The recitation of the reactor being "configured to facilitate contact between a first fluid and a second fluid" does not impart further patentable weight to the apparatus claims. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. See MPEP § 2114. Furthermore, the "first fluid" and the "second fluid" are not considered elements of the apparatus. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim, and the inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. See MPEP § 2115.

Applicant (at page 7, third paragraph) further argues,

"... Broughton does not teach or suggest that the axisymmetric body and the annular axisymmetric body, or baffling means, is formed by rotating a single curved line around an axis. According to Broughton, the baffling means has an upper concave portion and a lower convex portion (column 4, lines 51-55). If a single curved line were to be used to form the baffling means, both the upper and lower portion would either be concave or convex. It is not possible to form both a concave and a convex portion of a baffling means by rotating a single curved line around an axis. Thus, the upper and lower portions of the baffling means must be formed by rotating at least two curved lines around an axis, rather than rotating a single curved line around an axis as in claim 1."

The Examiner respectfully disagrees.

The cited portion of Broughton states, with emphasis added,

"Particle-free spaces are provided between each of the superposed beds 9 and such spaces are utilized for specially formed convex and concave baffling means indicated respectively as 11 and 12."

In addition, Broughton (at column 4, lines 60-65, with emphasis added) discloses,

“Actually, each of the upper and lower surfaces of baffle means 11 is of a parabolic configuration in order to provide the desired uniform square-front flow though the unit and passageway means and also maintain the horizontal fluid velocities that are equivalent along all points above and below beds that are in the same vertical line.

In addition, Broughton (at column 5, lines 10-15, with emphasis added) discloses,

“The upper and lower surfaces or faces for baffle means 12 will again be of a parabolic configuration in order that the desired fluid collections and redistributions will maintain uniform lateral velocities above and below a particular bed which are the same at points along the same vertical line of the chamber.”

Thus, the baffling means 11 (i.e., corresponding to the “axisymmetric body”) comprises a convex baffling means, formed from a convex parabolic line. As clearly shown in FIG. 2, both the upper and the lower portions of the baffling means 11 are convex. It is unclear as to how this construction differs from Applicant’s construction, since it is noted that the upper and the lower portions of Applicant’s axisymmetric body 2 are likewise convex (e.g., at FIG. 2).

Similarly, the baffling means 12 (i.e., corresponding to the “annular axisymmetric body”) comprises a concave baffling means, formed from a concave parabolic line. As clearly shown in FIG. 2, both the upper and the lower portions of the baffling means 12 are concave. It is unclear as to how this construction differs from Applicant's construction, since it is noted that the upper and the lower portions of Applicant's annular axisymmetric body 3 are likewise concave (e.g., at FIG. 2).

Applicant (at page 8, first paragraph) further argues,

“...Bodnaras does not teach or suggest an annular axisymmetric body being settled on the reactor shell as is taught in claim 1. Instead, Bodnaras teaches the inner

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core being mounted coaxially on a central shaft inside the inner shell (Figure 4 and paragraph 6, lines 2-5).”

However, Applicant’s argument is now moot based on the reinterpretation of the prior art to Bodnaras, as necessitated by the amendment to claim 1 reciting, "the annular axisymmetric body is settled on the reactor shell".

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s

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supervisor, Walter D. Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/
Primary Examiner, Art Unit 1797